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EXAMINER	
HENRY, CHRISTOPHER P	
ART UNIT	PAPER NUMBER
2617	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/566,619	QIAO, YUANXIN	
	Examiner	Art Unit	
	CHRISTOPHER HENRY	2617	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 February 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 February 2009* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *04/09/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Status of the Claims

Claims 1-14 are pending in this application.

Notice to Applicant

Applicant is notified the art unit for this application has been changed to art unit 2617 and further communications regarding the application should be marked appropriately, as needed.

Response to Arguments

1. Applicant's arguments filed 02/03/2009 have been fully considered but they are not persuasive.

2. Frigon discloses the combining of signals for the calculation of a frequency offset in a CDMA type system and was cited by the examiner for matching the combining of signals and calculation of frequency offset based on the combined signal. The input for the combination in Frigon's system would be diversity based, however, substituting the method of Chen which nearly matches the applicant's method of "determining number of effective base stations" for the first part of synchronization and using the output from Chens initial steps into the combiner would yield the same results as applicants claimed invention.

3. In response to applicant's arguments regarding Frigon:

> "First, step A of claim 1 discloses that a normal subscriber terminal receives more than one signal from number of effective base stations with same carrier frequency. In contrast, Frigon discloses that a mobile terminal comprising M diversity branches receives signals from only one base station."

Frigon discusses the first steps in achieving synchronization involve finding a base station by checking a number of codes against received signals to determine what base station should be chosen in his background. If a phone was between base stations, it would be receiving from more than one base station and the best base station/code would be chosen. Frigon discusses that the phone checks for all different codes that may be sent from different base stations. See Paragraph 5. Also, Chen was relied on regarding step A.

> "Second, step B of claim 1 discloses that the normal subscriber terminal combines the signals of each base station with same carrier frequency corresponding to said number of effective base stations with same carrier frequency based on the main path positions. In contrast, Frigon discloses that the diversity mobile terminal combining signals which are from only one base station and transmitted in M diversity branches."

The input provided to the combiner as discussed above is coming from the step A as disclosed in Chen, not Frigon, therefore applicants argument is moot.

> "Third, the combined signal for estimating the value of the carrier frequency offset in claim 1 is different from the combined signal in Frigon. For a normal subscriber terminal, combining signals from different base stations in claim 1 needs more information than combining signals transmitted in M diversity branches from only one base station in Frigon."

Again, the input into the combiner is coming from relied upon reference Chen which does use the main path positions. It is unclear what information would be needed that could not be provided from the method of Chen.

> "Furthermore, Frigon teaches away from the invention of claim 1: Frigon discloses a solution for synchronizing a mobile terminal comprising M diversity branches to a wireless network using diversity combination to acquire the code transmitted from a base station and to determine the frequency offset of the transmitted code. In contrast, the invention of claim 1 provides a method and a device for estimating carrier frequency offset in a subscriber terminal to make the carrier frequency offset in a subscriber terminal to meet the system requirements and thus improve the probability of success for the initial search for a cell. See, for example, p. 3, line 27 to p. 4, line 4 of the specification. Thus, Frigon seeks to address a different technical problem than, and teaches away from, the invention of claim 1. Thus, claim 1 is not obvious in light of Frigon."

Applicant's statement "Frigon discloses a solution for synchronizing a mobile terminal comprising M diversity branches to a wireless network using diversity combination to acquire the code transmitted from a base station and to determine the frequency offset of the transmitted code" appears to be Frigon "estimating carrier frequency offset in a subscriber terminal to make the carrier frequency offset in a subscriber terminal meet the system requirements and thus improve the probability of success for the initial cell search for a site". Frigon's combining occurs within the context of first finding the proper code/base station which is the initial cell search for a site. It is unclear what applicant's argument is as it appears to affirm the examiners rejection.

4. In response to applicants arguments regarding Chen:

> Claim 1 relates to a method and device for estimating carrier frequency offset in subscriber terminals in TD-SCDMA system. It focuses on estimating carrier frequency offset when performing initial cell search in TD-SCDMA system. In contrast, Chen et al relates to the flexible use of correlators when selecting the primary scrambling code from a multiple of scrambling code groups is disclosed in WCDMA system. It focuses on scrambling code identification when performing initial cell search in WCDMA system.

In both the TD-SCDMA and WCDMA disclosures it can be seen that the first step in synchronization would be to find the codes from the base stations being received when beginning to synchronize. The terminology may be different but the procedures, as cited, are the same. Again, Chen is reading on part A of the claim which is directly related to finding the code and therefore argument again appears to affirm examiners rejection.

> Furthermore, Chen et al teaches away from the invention of claim 1. Chen et al seeks to provide a cell search method, and related device, that make flexible use of correlators to select a primary scrambling code across a multiple of code group candidates using only a frame's worth of slots. In contrast, the

> invention of claim 1 provides a method and a device for estimating carrier frequency offset in a subscriber terminal to make the carrier frequency offset in a subscriber terminal to meet the system requirements and thus improve the probability of success for the initiate search for a cell. See, e.g., p. 3, line 27 to p. 4, line 4 of the specification. Thus, Chen et al seeks to solve a different technical problem than, and teaches away from, invention of claim 1 of the present application.

Applicant fails to distinguish between the method of Chen and making carrier frequency offset in a subscriber terminal meet the system requirements and thus improve the probability of success for the initiate cell search similar to previous argument where applicant claims Frigon teaches away.

5. In response to other arguments:

> In addition, the invention of claim 1 of the present application has at least the following advantages over the prior art: The method for estimating carrier frequency offset provided by the invention is especially suitable to a condition that the strengths and SIR of SYNC_DL signals received by a mobile user from several base stations are approximate among them, i.e., a mobile user is located at the joint edge of several cells, and with the method for carrier frequency offset estimation provided by the invention, the probability of success for the initiate search for a cell can be improved greatly. Even when the SYNC_DL signal received by a mobile user from one base station is much stronger and those received from other base stations are not so strong, the accuracy of adjustment for carrier frequency offset also can be improved by using the method for estimating carrier frequency offset provided by the invention. With respect to a method utilizing the SYNC_DL signals from one base station, the closer of the SYNC_DL signal strength and SIR from several base stations, the more improvement the accuracy of carrier frequency offset adjustment. (See, e.g., p.5, lines 13-26.)
> The above mentioned technical effects would not be obtained by Frigon and Chen et al. Therefore, claim 1, as well as dependent claims 5, 7 and 9, are not obvious over Frigon in view of Chen et al. The applicant respectfully requests the withdrawal of the rejection of claims 1-5, 7 and 9 under 35 U.S.C. § 103 over Frigon and Chen.

Chen is doing an initial cell search for the correct code. Although it is not a SYNC_DL code, not only is the SYNC_DL code not claimed, but in the context of a CDMA system the SYNC_DL code is the same type of code used in Chen's although the terminology and positioning with a control signal may be different. Chen very explicitly states, as cited by the examiner in the motivation for combination, that the search method improves the initial cell search and as described is the same type of procedure performed by applicant. Cases when the second best result may be the

proper choice would naturally be when a mobile station is between two or more base stations and the signal is approximate among them (See Chen Column 5, Lines 32-43).

6. Response to arguments regarding other claims:

> "Independent apparatus claim 13 includes limitations that correspond to those in claim 1. Thus for at least the same reasons stated above regarding claim 1, claims 13, as well as its dependent claim 14, are patentable over Frigon and Chen et al. The applicant respectfully requests the withdrawal of the rejection of claims 13-14 under 35 U.S.C. § 103 over Frigon and Chen.
> Regarding claim 6, which depends on claim 1, the additionally cited Li and Demir also fail to disclose or suggest the above-quoted limitations in claim 1. Thus, claim 1 is patentable over the reference cited against claim 6. Claim 6 is thus patentable for at least the same reasons that claim 1 is patentable. The applicant respectfully requests the withdrawal of the rejection of claim 6 under 35 U.S.C. § 103 over Frigon, Chen, Li and Demir.
> Regarding claim 8, which is dependent on claim 1, the additionally cited Li and Lucidarme also fail to disclose or suggest the above-quoted limitations in claim 1. Thus, claim 1 is patentable over the reference cited against claim 8. Claim 8 is thus patentable for at least the same reasons that claim 1 is patentable. The applicant respectfully requests the withdrawal of the rejection of claim 8 under 35 U.S.C. § 103 over Frigon, Chen, Li and Lucidarme.
> Regarding claims 10-12, which are dependent on claim 1, the additionally cited Ono also fails to disclose or suggest the above-quoted limitations in claim 1. Thus, claim 1 is patentable over the reference cited against claims 10-12. Claims 10-12 are thus patentable for at least the same reasons that claim 1 is patentable. The applicant respectfully requests the withdrawal of the rejection of claims 10-12 under 35 U.S.C. § 103 over Frigon, Chen and Ono."

The requested allowance of the aforementioned claims is based on the arguments with respect to claim 1. As the arguments for claim 1 have been refuted, so too have the arguments for the above claims.

Specification

7. The disclosure is objected to because of the following informalities:

a. Page 4, Line 2 in the original specification recites "...to make the carrier frequency offset in a subscriber terminal **to** meet the system requirements…", it is believe the applicant meant to recite "…in a subscriber terminal meet the system…".

b. Please review the specification for further errors.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. Claims 1-5, 7, 9, 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Frigon (US Patent Application Publication 2003/0108135) in view of Chen et al. (US Patent 7269206).

Regarding claim 1, A method for estimating carrier frequency offset in subscriber terminals in TD-SCDMA system, the method comprising:

A. determining number of effective base stations with same carrier frequency from which more than one signals are received by a subscriber terminal and main path positions of each signal;

B. combining the signals of each base station with same carrier frequency corresponding to the number of effective base stations with same carrier frequency based on the main path positions obtained in step A;

C. calculating a rough estimation value of the carrier frequency offset based on combined signal in step B.

Regarding A, Frigon discloses a method of determining a correct synchronization code (Paragraph 90-91) using multi-stage code acquisition

(Paragraph 92). Base stations using the same carrier frequency are identified using their synchronization code, as was discussed by the applicant. Frigon does not, however, expressly describe the method of determining number of effective base stations from which more than one signals are received by a subscriber terminal and main path positions of each signal to determine a synchronization code. Chen et al does disclose the method of determining a number of effective base stations from which more than one signals are received by a subscriber terminal and main path positions of each signal as discussed by the applicant. (Column 5 lines 9-20, 30-32, 37-42, 42-44, 50-58). The search for a proper code is the same for both the CDMA system of Chen and the system disclosed by the applicant in a TD-SCDMA and is a common feature in CDMA systems and the search for a code is necessitated in a CDMA system because multiple base stations will share the same frequency reading on the same carrier frequency. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to obtain a synchronization code by first determining number of effective base stations from which more than one signal are received by a subscriber terminal and main path positions of each signal as the suggestion lies in Chen et al that this may improve the accuracy of choosing a synchronization code from 93% percent using solely the maximum received value to 98% using the method that is used to determine the number of effective base stations from which more than one signals are received by a subscriber terminal and main path positions of each signal. (Column 5 lines 32-42).

Regarding B, Frigon. discloses combining the signals of each station corresponding to said number of effective base stations based on the main path positions obtained. (Paragraph 136, Frigon shows how to combine a signal using weighted coherent combining diversity which can be applied to the signals received from the various base stations)

Regarding C, Frigon discloses calculating a rough estimation value of the carrier frequency offset based on combined signal (Paragraph 137, Figures 17-18)

Regarding claim 2, Frigon in view of Chen et al discloses a method as claimed in claim 1, wherein the determining number of effective base stations with same carrier frequency from which more than one signals are received by a subscriber terminal in step A comprises steps:

A1. calculating peak power value of each signal received by a subscriber terminal, and selecting the peak power values of predefined maximum number of base stations from higher to lower; (Chen Column 5, lines 24-27 where the examiner is reading the correlation results as power values and lines 30-32, 37-44)

A2. determining the number of effective base stations with same carrier frequency from the signals determined in step A1 by the predefined maximum number of base stations with same carrier frequency are received by the subscriber terminal by comparing the ratio of the highest peak power value from the order in step A1 to the subsequent peak power values with the given threshold. (Chen Column 5, lines 44-55)

Regarding claim 3, Frigon in view of Chen et al. discloses a method as claimed in claim 2, wherein the signals are synchronous downlink pilot signals, and step A1 further comprises steps:

A11. shift multiple correlating a local synchronous downlink pilot code and a received synchronous downlink pilot signal resulting in a power value of the synchronous downlink pilot signals received by the subscriber terminal ; (Chen Column 5, lines 22-27, where the standard synchronization process and developing correlation results table in a standard manner is defined in the background of the invention in Column 2, lines 17-31)

A12. determining peak power values corresponding to each of the synchronous downlink pilot codes. (Chen Column 5, lines 22-27, where the standard synchronization process and developing correlation results table in a standard manner is defined in the background of the invention in Column 2, lines 34-35)

Regarding claim 4, a method as claimed in claim 3 wherein said method further comprises steps in between step A11 and step A12:

selecting the power values of each frame of more than one frames and averaging the power values of each frame.

Chen et al. discloses using a matched filter to perform the synchronization but does not expressly disclose selecting the power values of each frame of more than one frames and averaging said power values of each frame. Frigon discloses selecting the power values of each frame of more than one frames and averaging said power values of each frame (Frigon Paragraph 9, lines 4-10). Therefore it would have been obvious

to one of ordinary skill in the art at the time of the invention to select the power values of each frame of more than one frames and average said power values of each frame. Frigon discloses that in a low signal-to-noise ratio environment the received signal may not be strong enough and that averaging the signals will help achieve a better result. (Frigon Paragraph 9, lines 1-2).

Regarding claim 5, Frigon in view of Chen et al. discloses a method as claimed in claim 2, wherein said step A2 further comprises steps:

A21. numbering the peak power values ordered from the highest to the lowest and setting a current sequence number as predefined number of the base stations with same carrier frequency; (Chen Column 5, lines 42-44)

A22. determining whether the highest peak power value and a peak power value corresponding to the current sequence number are greater than the given threshold, if so, setting the number of effective base stations with same carrier frequency from which the signals are received by a subscriber terminal as the value of the current sequence number, otherwise, the current sequence number decreases by one and returns back to step A22. (Chen Column 5, lines 44-55, Figure 9)

Regarding claim 7, Frigon in view of Chen discloses a method as claimed in claim 2, the method further comprises a step before said step B:

multi-path combining signals of each base station with same carrier frequency. (Paragraph 130, Frigon shows how to combine a signal using weighted coherent combining diversity which can be applied to each individual base station's signal)

Regarding claim 9, Frigon in view of Chen discloses a method as claimed in claim 1, wherein said step B of incorporating the signals of each base station with same carrier frequency corresponding to the number of base stations with same carrier frequency is: equal gain combining or weighted combining signals of each base station with same carrier frequency corresponding to the number of base stations with same carrier frequency to obtain an combined signal sequence. (Paragraph 136, Frigon shows how to combine a signal using weighted coherent combining diversity which can be applied to the signals received from the various base stations)

Regarding claim 13, Frigon in view of Chen discloses a device for estimating carrier frequency offset in TD-SCDMA system, the device comprising:

a decision module for determining number of base stations with same carrier frequency from which signals are received by a subscriber terminal and a main path position of signal transmitted from each base station with same carrier frequency based on the signals received by a subscriber terminal, and then outputting the number of the effective base station with same carrier frequency and the main path position of each signal to an combining module; (Chen, Column 5 lines 9-20, 30-32, 37-42, 42-44, 50-58). The search for a proper code is the same for both the CDMA system of Chen and the system disclosed by the applicant in a TD-SCDMA and is a common feature in CDMA systems and the search for a code is necessitated in a CDMA system because multiple base stations will share the same frequency reading on the same carrier frequency. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention as previously noted in Claim 1 to obtain a synchronization code by

first determining number of effective base stations from which more than one signal are received by a subscriber terminal and main path positions of each signal as the suggestion lies in Chen et al that this may improve the accuracy of choosing a synchronization code from 93% percent using solely the maximum received value to 98% using the method that is used to determine the number of effective base stations from which more than one signals are received by a subscriber terminal and main path positions of each signal. (Column 5 lines 32-42).

a combining module for combining the signals from each base station with same carrier frequency corresponding to the number of effective base stations with same carrier frequency based on the main path position of signals and then outputting the combined signals to a carrier frequency offset acquiring module; (Frigon Paragraph 136, Frigon shows how to combine a signal using weighted coherent combining diversity which can be applied to the signals received from the various base stations)

a carrier frequency offset acquiring module for calculating a rough estimating value of the carrier frequency offset based on the combined signals. (Paragraph 137, Figures 17-18)

Regarding claim 14, Frigon in view of Chen discloses a device as claimed in claim 13, wherein the device further comprises a multi-path combining module for multi-path combining the signals of each base station with same carrier frequency, and then outputting the multi-path combined signal to the combining module, if the number of effective base stations with same carrier frequency is greater than 1. (Frigon Paragraph

130, Frigon shows how to combine a signal using weighted coherent combining diversity which can be applied to each individual base station's signal)

10. Claim 6 rejected under 35 U.S.C. 103(a) as being unpatentable over Frigon (US Patent Application Publication 2003/0108135) in view of Chen et al. (US Patent 7269206) as applied to claim 1 above, and further in view of Li et al. (US Patent 6778588) in view of Demir et al. (US Patent Application Publication 2003/0072357).

Regarding claim 6, Frigon in view of Chen discloses receiving synchronization signals and using a method of correlation to obtain synchronization but does not expressly disclose a method as claimed in claim 1, further comprises, before said step A, reading vector data of 128 chips while receiving synchronous downlink pilot signals at the beginning of a downlink pilot time slot. Li et al discloses using a method of obtaining synchronization by correlating over a time, including a guard period of N symbols followed by the synchronization code symbols followed by another guard period of N symbols. (Column 6, lines 33-34) Demir et al discloses the structure of a transmission in a TD-SCDMA system as having a 32 chip guard period followed by a 64 chip synchronization code followed by a 96 chip guard period of which 32 could be used as according to the method disclosed by Li et al. (Column 1, lines 49-54) Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a method as claimed in claim 1, further comprises, before said step A, reading vector data of 128 chips while receiving synchronous downlink pilot signals at the beginning of a downlink pilot time slot. Demir et al discloses a structure that is used for

obtaining synchronization and Li et al discloses a method for obtaining synchronization. Li et al discloses a method for obtaining synchronization by correlating over a certain time window of guard periods and a 64 chip synchronization period as a method for obtaining correct synchronization timing and Chen et al requires the use of a standard synchronization process that takes the correlations across an input sequence. (Column 5, lines 22-27 where the standard synchronization process and developing correlation results table in a standard manner is defined in the background of the invention in Column 2, lines 17-31). The TD-SCDMA uses a 64 chip synchronization code and correlating across 128 chips (32 chip guard period on either side) allows for finding the correct synchronization in the presence of timing delays.

11. Claim 8 rejected under 35 U.S.C. 103(a) as being unpatentable over Frigon (US Patent Application Publication 2003/0108135) in view of Chen et al. (US Patent 7269206) as applied to claim 2 above, and further in view of Li et al. (US Patent 6778588) in view of Lucidarme et al (US Patent Application Publication 2004/0196793).

Regarding claim 8, Frigon in view of Chen discloses a method as claimed in claim 7, but does not expressly disclose wherein said step of multi-path combining signals of each base station with same carrier frequency comprises steps:

beginning from a point of previously predetermined number of the peak power value, reading data of synchronous downlink pilot signals at a point which is 2 times of the predefined value added length of the synchronous downlink pilot code;

performing Max Ratio Combination after eliminating phase difference between symbols of multi-path synchronous downlink pilot signal with different time delay and the phase difference of delay path.

Li et al discloses beginning from a point of previously predetermined number of the peak power value, reading data of synchronous downlink pilot signals at a point which is 2 times of the predetermined value added length of said synchronous downlink pilot code. Li discusses obtaining P symbols before and after a training sequence midamble. (Column 9, lines 2-7) The midamble is at a known location in a time slot. (Column 8, lines 59-67) Lucidarme discloses performing Max Ratio Combination after eliminating phase difference between symbols of multi-path synchronous downlink pilot signal with different time delay and the phase difference of delay path. (Paragraph 5) Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a method as claimed in claim 7, wherein said step of multi-path combining signals of each base station comprises steps:

beginning from a point of previously predetermined number of the peak power value, reading data of synchronous downlink pilot signals at a point which is 2 times of the predetermined value added length of said synchronous downlink pilot code;

performing Max Ratio Combination after eliminating phase difference between symbols of multi-path synchronous downlink pilot signal with different time delay and the phase difference of delay path.

Using maximum ratio combining allows greater accuracy in estimating the transmitted signal and using P symbols before and after will allow time variations in received signal to be multipath combined.

12. Claims 10-12 rejected under 35 U.S.C. 103(a) as being unpatentable over Frigon (US Patent Application Publication 2003/0108135) in view of Chen et al. (US Patent 7269206) as applied to claim 9 above, and further in view of Ono (US Patent 6996156).

Regarding claim 10, Frigon in view of Chen discloses calculating frequency offset (Frigon Paragraph 137) but does not expressly disclose method as claimed in claim 9, wherein step C is to obtain a rough estimating value of the carrier frequency offset according to the phase difference between two symbols spaced by a defined distant in the combined signal sequence. Ono discloses a method as claimed in claim 9, wherein said step C is to obtain a rough estimating value of the carrier frequency offset according to the phase difference between two symbols spaced by a defined distant in said combined signal sequence (Column 14, lines 52-64). Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to use a method as claimed in claim 9, wherein said step C is to obtain a rough estimating value of the carrier frequency offset according to the phase difference between two symbols spaced by a defined distant in said combined signal sequence. Ono discloses a method of frequency offset calculation and Frigon discusses using a method of frequency offset calculation. Ono discloses a more exact method of calculating the frequency offset for better synchronization.

Regarding claim 11, Ono discloses a method as claimed in claim 10, wherein step C further comprises: estimating carrier frequency offset for a predefined times, and then averaging them to get a carrier frequency offset estimation. (Column 14, lines 52-64)

Regarding claim 12, Ono discloses method as claimed in claim 10, wherein step C is to sum up the phase differences between two symbols spaced by a defined distant in the incorporated signal sequence, and then computing the phase angle to get the carrier frequency offset estimation. (Column 14, lines 52-64)

Conclusion

13. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHRISTOPHER HENRY whose telephone number is

571-270-7496. The examiner can normally be reached on Monday - Friday 6:30 am - 4:00 pm EST, Off Every Other Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dwayne Bost can be reached on 571-272-7023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/C. H./
Examiner, Art Unit 2617

/Dwayne D. Bost/
Supervisory Patent Examiner,
Art Unit 2617